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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/010,231	12/07/2001	William Nicholas Lawless	LAE 0031 PA	5856
7590	02/12/2004		EXAMINER	
Killworth, Gottman, Hagan & Schaeff, L.L.P. Suite 500 One Dayton Centre Dayton, OH 45420-2023			OLSEN, KAJ K	
			ART UNIT	PAPER NUMBER
			1753	

DATE MAILED: 02/12/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

<b>Office Action Summary</b>	Application No.	Applicant(s)
	10/010,231	LAWLESS, WILLIAM NICHOLAS
	Examiner	Art Unit
	Kaj Olsen	1753

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

#### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

- 1) Responsive to communication(s) filed on \_\_\_\_\_.
- 2a) This action is **FINAL**.                                    2b) This action is non-final.
- 3) Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

- 4) Claim(s) 1-30 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) Claim(s) \_\_\_\_\_ is/are allowed.
- 6) Claim(s) 1-30 is/are rejected.
- 7) Claim(s) \_\_\_\_\_ is/are objected to.
- 8) Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

- 9) The specification is objected to by the Examiner.
- 10) The drawing(s) filed on \_\_\_\_\_ is/are: a) accepted or b) objected to by the Examiner. Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a). Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

- 12) Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
  - a) All    b) Some \* c) None of:
    1. Certified copies of the priority documents have been received.
    2. Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
    3. Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

- 1) Notice of References Cited (PTO-892)
- 2) Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date 031102 and 041503.

- 4) Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_.
- 5) Notice of Informal Patent Application (PTO-152)
- 6) Other: \_\_\_\_\_.

## DETAILED ACTION

### *Claim Rejections - 35 USC § 112*

1. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

2. Claims 3-29 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the enablement requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention.

3. Claim 3 specifies the presence of a diffusion barrier and claims that the sensor body is disposed in said diffusion limited portion of the gas passage. The claimed diffusion barrier would appear to correspond to element 230 of the specification. However, this embodiment shows the oxygen sensing portion of the sensor body in what the examiner would construe as being on the *outside* of the diffusion barrier (see fig. 8b). It would appear that only a portion of the sensor body is *in* the diffusion-limited portion contrary to what the claim states. Clarification as to how the disclosure is enabling for an embodiment where the entire sensor body is in the diffusion-limited portion of the passageway. Similarly with claim 19, how can an oxygen-porous electrode layer placed outside of the diffusion-limited barrier tell us about the oxygen content "within" the diffusion-limited portion of the gas passage.

4. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

5. Claims 5 and 6 rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

6. In claim 5, it is unclear what one would reasonably construe as being a "favorable NOx to oxygen ratio".

***Claim Rejections - 35 USC § 103***

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims 1-19, 21-23, 25-28 and 30 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tojo et al (USP 6,068,747) in view of Kato et al (USP 5,672,811).

3. Tojo discloses a combined oxygen and NOx sensor comprising a sensor body having a plurality of oxygen-porous electrode layers (228, 229), a plurality of NOx sensing electrodes (38, 39), and a plurality of oxygen ion conducting ceramic layers 12, 13 interposed between respective oxygen electrodes and NOx electrodes (fig. 9, col. 5, lines 9-32, and col. 8, line 43 through col. 9, line 19). With respect to the claimed electrical outputs, ammeters A1 and A0 are utilized to provide electrical outputs for the oxygen and NOx contents respectively (see cited passages above). With respect to the electrical outputs being "electrically isolated" from each other, the fact that the various electrical signals are outputted via electrical connectors on different levels of the sensor (see fig. 14 as an example) would read on applicant's electrical

isolation giving the claim language their broadest reasonable interpretation. With respect to the use of a material for catalytic dissociation into oxygen, see col. 2, lines 59-65 and col. 5, lines 4-

14. Although Tojo does not appear to ever explicitly state that the various electrodes of the sensor are porous, it is generally well known that gas sensitive electrodes should have a degree of porosity such that the gas to be sensed can penetrate them thereby increasing the effective surface area of the electrodes. In particular, this is demonstrated by Kato where various electrodes are explicitly disclosed as being porous (e.g. see col. 11, line 56 through col. 12, line 61). It would have been obvious to one of ordinary skill in the art at the time the invention was being made to utilize the teaching of Kato '811 for the sensor of Tojo in order to make the electrodes more permeable to gas. With respect to the use of Rh, see col. 12, line 38 of Kato '811.

4. With respect to the diffusion barrier, see Tojo col. 8, lines 23-26. Kato '811 discloses alternate forms of the barrier structure (e.g. see fig. 18).

5. With respect to operating the sensor for a particular NOx to oxygen ratio, that is only the intended use of the apparatus and the intended use need not be given further due consideration in determining patentability.

6. With respect to the use of feedback and an oxygen pumping portion, see Tojo, col. 13, lines 4-14.

7. With respect to the various electrode layers having matching polarity and equivalent electrical potential, this limitation is either an intended means for operating the sensor (and not given further due consideration) or is an inherent function of the choice of materials utilized for

the electrodes. In the latter case, Tojo already set forth the combination of Pt and Au and Kato already set forth the use of Rh (see citations above).

8. With respect to a heater temperature of 800 °C, that is only the intended use of the apparatus and the intended use need not be given further due consideration in determining patentability. With respect to the heater being configured to heat to that temperature, the heaters of Tojo and/or Kato would presumably be able to achieve those temperatures if enough current were driven through the heater module.

9. Claims 20 and 29 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tojo and Kato '811 as applied to claims 2 and 28 above, and further in view of GB 2,288,873 A.

10. The references set forth all the limitations of the claims, but did not explicitly recite the use of a zirconia tube, GB teaches in an alternate combination NOx and oxygen sensor that sensors can be configured either as planar structures (like Tojo and Kato '811) or as structures configured about an electrolyte tube (compare fig. 1-4 with 5). It would have been obvious to one of ordinary skill in the art at the time the invention was being made to utilize the teaching of GB '873 with the sensor of Tojo and Kato '811 because the substitution of one known equivalent electrolyte form for another requires only routine skill in the art.

11. Claim 24 is rejected under 35 U.S.C. 103(a) as being unpatentable over Tojo and Kato '811 as applied to claim 3 above, and further in view of Holfelder et al (USP 4,502,939).

12. The references set forth all the limitations of the claim, but did not explicitly recite the use of a zirconia diffusion barrier. Holfelder teaches that zirconia is a conventional material utilized for porous gas sensor structures (col. 5, lines 12-20). The use of zirconia would also ensure that the diffusion barrier would thermally expand at a rate similar to the rate of the

electrolyte expansion (the electrolyte is also zirconia), and it would have been obvious to one of ordinary skill in the art at the time the invention was being made to utilize the teaching of Holzfelder for the sensor of Tojo and Kato '811 both because the use of known diffusion material requires only routine skill in the art and because zirconia would ensure the thermal expansion for the barrier matches that of the electrolyte, thereby preventing cracking.

***Information Disclosure Statement***

13. The examiner has not considered the two non-patent literature documents because they are not present in the file. The examiner contacted the applicant's representative to request faxed copies of those documents, but no documents were ever provided. The examiner again requests that those documents be provided.

***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Kaj Olsen whose telephone number is (571) 272-1344. The examiner can normally be reached on Monday through Thursday from 7:00 A.M. to 4:30 P.M. and on alternate Fridays.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nam Nguyen, can be reached on 571-272-1342. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications

may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



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AU 1753  
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